

## PATENT COOPERATION TREATY

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PCT

NOTIFICATION OF TRANSMITTAL OF  
INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT

(PCT Rule 71.1)

Date of Mailing  
(day/month/year)

05 AUG 2004

Applicant's or agent's file reference

~~595.0033PCT~~

7210336001-3221000

## IMPORTANT NOTIFICATION

International application No.

PCT/US02/26276

International filing date (day/month/year)

15 August 2002 (15.08.2002)

Priority date (day/month/year)

Applicant

HONEYWELL INTERNATIONAL INC.

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.
4. **REMINDER**

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices)(Article 39(1))(see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

Name and mailing address of the IPEA/US

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Form PCT/IPEA/416 (July 1992)

Authorized officer

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Jean Proctor  
Paralegal Specialist

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# PATENT COOPERATION TREATY

# PCT

## INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference <b>595.0033PCT</b>	<b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. <b>PCT/US02/26276</b>	International filing date (day/month/year) <b>15 August 2002 (15.08.2002)</b>	Priority date (day/month/year)
International Patent Classification (IPC) or national classification and IPC  <b>IPC(7): H01B 3/02, 3/30, 3/46; B32B 3/26; C08G 65/00, 77/04 and US Cl.: 252/570,573; 428/304.4,312.6,447; 521/154,180; 525/390,416,474,534</b>		
Applicant  <b>HONEYWELL INTERNATIONAL INC.</b>		
<p>1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of <u>6</u> sheets, including this cover sheet.</p> <p><input type="checkbox"/> This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).</p> <p>These annexes consist of a total of <u>—</u> sheets.</p>		
<p>3. This report contains indications relating to the following items:</p> <ul style="list-style-type: none"> <li>I <input checked="" type="checkbox"/> Basis of the report</li> <li>II <input type="checkbox"/> Priority</li> <li>III <input type="checkbox"/> Non-establishment of report with regard to novelty, inventive step and industrial applicability</li> <li>IV <input type="checkbox"/> Lack of unity of invention</li> <li>V <input checked="" type="checkbox"/> Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</li> <li>VI <input type="checkbox"/> Certain documents cited</li> <li>VII <input type="checkbox"/> Certain defects in the international application</li> <li>VIII <input checked="" type="checkbox"/> Certain observations on the international application</li> </ul>		
Date of submission of the demand  <b>04 March 2004 (04.03.2004)</b>	Date of completion of this report  <b>26 July 2004 (26.07.2004)</b>	
Name and mailing address of the IPEA/US Mail Stop PCT, Attn: IPEA/US Commissioner for Patents P.O. Box 1450 Alexandria, Virginia 22313-1450 Facsimile No. (703) 305-3230	Authorized officer  <b>Jeffrey B. Robertson</b>  Telephone No. 571-272-1700	

*Jean Proctor*  
 Paralegal Specialist

**I. Basis of the report****1. With regard to the elements of the international application:\***☒ the international application as originally filed.☒ the description:

pages 1-33 as originally filed

pages NONE, filed with the demand

pages NONE, filed with the letter of \_\_\_\_\_.

☒ the claims:

pages 34-37, as originally filed

pages NONE, as amended (together with any statement) under Article 19

pages NONE, filed with the demand

pages NONE, filed with the letter of \_\_\_\_\_.

☒ the drawings:

pages 1-10, as originally filed

pages NONE, filed with the demand

pages NONE, filed with the letter of \_\_\_\_\_.

☐ the sequence listing part of the description:

pages NONE, as originally filed

pages NONE, filed with the demand

pages NONE, filed with the letter of \_\_\_\_\_.

**2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.**

These elements were available or furnished to this Authority in the following language \_\_\_\_\_ which is:

☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).☐ the language of publication of the international application (under Rule 48.3(b)).☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).**3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:**☐ contained in the international application in printed form.☐ filed together with the international application in computer readable form.☐ furnished subsequently to this Authority in written form.☐ furnished subsequently to this Authority in computer readable form.☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.**4. ☐ The amendments have resulted in the cancellation of:**☐ the description, pages NONE☐ the claims, Nos. NONE☐ the drawings, sheets/fig NONE**5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).\*\***

\* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).

\*\* Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.

**V. Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement****1. STATEMENT**

Novelty (N)	Claims <u>10,22,25,41</u>	YES
	Claims <u>1-9,11-21,23,24,26-40</u>	NO
Inventive Step (IS)	Claims <u>10,22,25,41</u>	YES
	Claims <u>1-9,11-21,23,24,26-40</u>	NO
Industrial Applicability (IA)	Claims <u>1-41</u>	YES
	Claims <u>NONE</u>	NO

**2. CITATIONS AND EXPLANATIONS**

Please See Continuation Sheet

**VIII. Certain observations on the international application**

The following observations on the clarity of the claims, description, and drawings or on the questions whether the claims are fully supported by the description, are made:

Claim 25 is objected to under PCT Rule 66.2(a)(v) as lacking clarity under PCT Article 6 because claim 25 is indefinite for the following reason(s): Claim 25 depends from itself.

**Supplemental Box**

(To be used when the space in any of the preceding boxes is not sufficient)

**V. 2. Citations and Explanations:**

Initially it is noted that Hacker (U.S. Patent No. 6,472,076) was indicated an X,P reference. However, it is noted that Hacker was published after the international filing date, and for that reason, it does not qualify as prior art to the present application.

Claims 1-9, 11-21, 23, 24, 26-40 lack novelty under PCT Article 33(2) as being anticipated by Hawker et al. (U.S. Patent No. 6,107,357).

For claims 1 and 28, Hawker teaches novel dielectric materials in column 3, lines 27-30. For claims 1, 4-9, and 35-40, in column 6, line 14 through column 7, line 57, Hawker teaches host polymers including organic compounds such as poly(arylene ethers) (column 6, line 56). For claims 4-6, 9, 35-37, and 40, in column 6, lines 24-51, Hawker teaches siloxanes including hydrogen silsesquioxanes and alkyl silsesquioxanes. In column 8, lines 1-24, Hawker teaches porogens, where the porogen is a polymer comprised of monomer units. Since applicant has claimed a "monomer component", the claim has been interpreted to read on substances that contain monomer units. Hawker discloses that the porogen is coupled to the host polymer.

For claims 2 and 28-32, in column 10, lines 37-49, Hawker teaches that upon heating, the porogen decomposes to volatile fragments that diffuse out of the host matrix, leaving voids behind. For claims 3, 16-21, 23, 24, 26, and 27, in column 10, line 50 through column 11, line 60, Hawker teaches a low dielectric material with a dielectric constant of preferably less than 2.5. Hawker teaches that these materials are used in electronic devices such as integrated circuits. Here, Hawker also discloses that the composition has cell pores (plural, at least two) of preferably less than about 10nm.

For claims 11-15, 33, and 34, in column 4, line 64 through column 5, line 52, Hawker teaches that the term alkyl contains branched and cyclic groups. In column 8, lines 1-21, Hawker teaches that alkyl substituted styrene may be used, which contains an aromatic group. For claim 15, Hawker teaches the use of methyl methacrylate, which has a saturated bond.

Claims 1-7, 9, 11-21, 23, 24, 26-38, and 40 lack novelty under PCT Article 33(2) as being anticipated by Zhong (U.S. Patent No. 6,143,360).

For claims 1, 2, 3, 16-19, 28, and 32, in column 3, lines 13-27, Zhong teaches silicone resin compositions that are used to form low dielectric constant films for electronic devices. In column 3, lines 30-66, Zhong teaches that a hydrosilicon resin is contacted with a 1-alkene so that precursor is bonded to the hydrosilicon resin. Here Zhong also teaches that upon heating to a sufficient temperature, thermolysis occurs, where the alkyl substituents are liberated to form a nonporous resin. For claims 4-7, 9, 35-38, and 40, Zhong teaches formulas showing hydrogen siloxanes and organohydrogensiloxanes. For claim 9, the formula  $(\text{HSiO}_{1/2})_n$  is a caged structure.

For claims 11, 12, 15, 33, and 34, in column 4, line 57 through column 5, line 6, Zhong teaches that the alkenes are preferably branched alkenes. The alkenes listed have at least one saturated bond.

For claims 20, 21, 23, 24, 26, 27, and 29-31, Zhong teaches in column 6, lines 39-62 that nanoporous films are produced that have dielectric constants preferably less than about 2.5. Here, Zhong also teaches that the pore diameter is in a range of 0.3 to 2 nm.

**Supplemental Box**

(To be used when the space in any of the preceding boxes is not sufficient)

Claims 1-3, 7, 8, 14, 16-21, 23, 24, 26-32, 38, and 39 lack novelty under PCT Article 33(2) as being anticipated by Lau et al. (U.S. Patent No. 6,156,812).

For claim 1, in column 3, lines 13-52, Lau teaches nanoporous materials that contain a polymer component (structural component) and thermolabile groups (monomer component). For claims 7 and 38, Lau teaches that the structural precursor is organic. For claims 8 and 39, in column 7, lines 31-34, Lau teaches that the polymer component is poly(arylene ether). In column 7, lines 53-67 through column 8, lines 1-24, Lau teaches thermolabile groups containing connector moieties that bond to the polymer strand. These groups can be aromatic as required in claim 14.

For claims 3, and 16-19, in column 12, lines 14-30, Lau teaches that dielectric materials are formed and used in electronic components such as circuit boards.

For claims 1, 20, 21, 23, 24, in column 11, lines 55 to 67, Lau teaches materials with low dielectric constants in the range of 2.0 to 2.5. For claims 26-31, in column 12, lines 9-16, Lau teaches nanoporous materials that have voids that are about 1 nm in size. For claims 2, 28, and 32, in column 8, lines 25-56, Lau teaches degrading of the thermolabile group through heat.

Applicant argues that the Hawker, Zhong, and Lau references applied above do not anticipate the claims because the term "radical precursor" means that there is a portion of the monomer component that remains coupled to the polymer after volatilization. The examiner disagrees. The phrase "at least in part liberated from the structural precursor" also includes situations where all the radical precursor is liberated. This phrase requires at a minimum that the radical precursor is in part liberated, and does not require that some of the monomer component remains. It is also pointed out that this language does not appear in the claims. Regarding the method of producing the dielectric material, the references do teach such a method as described for claim 28.

Claims 1-41 meet the criteria set out in PCT Article 33(4), and thus are industrial applicability because the subject matter claimed can be made or used in industry in low dielectric materials for electronic components.

Claims 10, 22, 25, and 41 meet the criteria set out in PCT Article 33(2)-(3), because the prior art does not teach or fairly suggest materials where the structural component is an adamantane based molecule or where the dielectric constant is less than 2.